

DVD, directory, management information, MP3, text

## SPECIFICATION

### Title

5       **METHOD OF DISPLAYING DIRECTORY INFORMATION IN DVD PLAYER**

### Brief Description Of The Drawings

FIG. 1 is a diagram showing the construction of an  
10 optical disk drive device in which a method of displaying  
directory information according to the present invention is  
implemented;

FIG. 2 is a flowchart illustrating a preferred  
embodiment of the method of displaying directory  
15 information according to the present invention;

FIG. 3 is a diagram showing an example of a plurality  
of directories, which exist on an optical disk, and files,  
which are recorded in the directories; and

FIGS. 4 to 6 are diagrams showing examples of  
20 directory information output onto a screen at the request  
of a user.

### Major Elements In Drawings

10 : optical disk (DVD)	11 : spindle motor
25   20 : optical pickup	
30a : digital recording signal processing unit	
30b : digital reproduction signal processing unit	
40 : channel bit encoder	
41 : optical driver	50 : R/F unit
30   60 : servo unit	70 : drive unit
80 : microcomputer	81 : memory
90 : MPEG decoder	91 : NTSC encoder

92: OSD

### **Background Of The Invention**

The present invention relates to a method of displaying information about directories (hierarchical structure) existing on an optical disk, thus allowing a user to easily identify directories in which MP3 files exist.

10 In the case where MPEG layer-3 (MP3) files exist on an optical disk (for example, a DVD), different types of data (text) are generally prepared and co-exist along with the MP3 files. Accordingly, when desiring to identify types of files recorded on a disk, a user can identify the  
15 types of files only using a Personal Computer (PC). Furthermore, when desiring to identify the types of files that are recorded on the disk using the PC, the user must open the directories that have been recorded on the disk one by one and check the details thereof. Accordingly,  
20 there is a problem in that usage is inconvenient, and thus a lot of time is required to play back MP3 music.

### **Explanation Of The Invention**

It is an object of the present invention to provide a  
25 method of displaying directory information, which provides information about directories existing on an optical disk, thus allowing a user to easily identify directories in which MP3 files exist.

In order to achieve the above object, the present  
30 invention provides a method of displaying directory information, including the first step of checking information about directories for data files, which are recorded on a recording medium, and attributes of the

respective data files; the second step of generating Identification (ID) marks for visually identifying files, having a specific attribute, based on information about the checked attributes of the data files; and the third step of displaying the generated ID marks, in conjunction with the information about directories for the checked files, on a screen.

In addition, the present invention provides a method of displaying directory information, including the first step of checking information about directories for data files, which are recorded on a recording medium, and attributes of the respective data files; the second step of generating ID marks for visually identifying files, having a specific attribute, based on information about the checked attributes of the data files; and the third step of displaying information about the selected file and an upper directory including the selected file on a screen.

An embodiment of a method of displaying directory information according to the present invention will be described now with reference to the accompanying drawings.

FIG. 1 is a diagram showing the construction of an optical disk (DVD-RAM) drive device in which a method of displaying directory information according to the present invention is implemented. The optical disk drive device includes a digital recording signal processing unit 30a for converting an input digital data stream into data in a recording format by adding an Error Correction Code (ECC) to the input digital data stream, a channel bit encoder 40 for converting the data, which has been converted into the recording format, into a bit stream again, an optical driver 41 for outputting a quantity-of-light drive signal depending on an input signal, an optical pickup 20 for

recording signals on the optical disk 10 according to the quantity-of-light drive signal, and detecting recorded signals from the recording surface of the optical disk 10, an R/F unit 50 for performing filtering and waveform  
5 shaping on signals detected by the optical pickup 20 and outputting binary signals, a drive unit 70 for driving a spindle motor 11 that rotates the optical disk 10, a servo unit 60 for controlling the driving of the drive unit 70 based on the Tracking Error (T.E) and Focus Error (F.E)  
10 signals of the optical pickup 20 and the rotational speed of the optical disk 10, a digital reproduction signal processing unit 30b for restoring the binary signals to original moving image compression data using the device's own clock synchronized in phase with the binary signals, a  
15 MPEG decoder 90 for decoding the restored moving image compression data and outputting video and audio signals, a NTSC encoder 91 for converting signals, which are output from the MPEG decoder 90, into NTSC signals and outputting the NTSC signals, an OSD 92 for displaying text in OSD form,  
20 a microcomputer 80 for recording directory management information on the optical disk 10 and controlling the output and display of the recorded directory management information, and memory 81 for storing data, such as the directory management information.

25 FIG. 2 is a flowchart illustrating a preferred embodiment of the method of displaying directory information according to the present invention. The displaying method of FIG. 1 according to the present invention is described in detail with reference to the  
30 construction of the drive device of FIG. 1 below.

A description of the optical disk drive device constructed as described above is given below. First, under the assumption that there is a plurality of

directories in which MP3 files and, for example, different types of text files are already recorded, on the optical disk 10 as shown in FIG. 3, a user may generate the directory (hierarchical structure) management information 5 and record the generated directory management information on the optical disk 10. For this purpose, the user requests that 'indications of presence (O)' are marked for directories in which MP3 files exist via the microcomputer 80, so that, when directory information is output through a 10 screen later, the 'indications of presence (O)' can be marked for the respective directories in which MP3 files are stored.

When directory management information, including information for displaying the 'indications of presence 15 (O)' for the respective directories in which MP3 files and information about types of files (file names) recorded in respective directories, is generated at the request of the user, the microcomputer 80 causes the directory management information to be recorded in the specific region of the 20 optical disk 10, that is, a user information region between a lead-in region and a program region. For this purpose, the digital recording signal processing unit 30a generates an Error Correction Code (ECC) block by adding error correction parity information to encoded and input data for 25 reliability for the recording/reproduction of input digital data, and the channel bit encoder 40 converts a digital bit stream, which is output from the digital recording signal processing unit 20, in the form of a pulse-width modulated signal for recording on the optical disk 10, and applies 30 the signal, which is obtained through the conversion, to the optical driver 41. Thereafter, the microcomputer 80 controls the optical driver 41 so that a recording signal is output by optimum optical drive current, and the optical

driver 41 causes a pulse-width modulated signal to be recorded in the corresponding region of the optical disk 10 by applying a signal, which is generated by corresponding optical drive power, to the optical pickup 20.

5 As described above, when there is a request from the user in the state in which directory management information is recorded on the optical disk 10 at step S10, the microcomputer 80 rotates the optical disk 10 by applying drive voltage, to correspond to the appropriate  
10 reproduction speed for the inserted and seated optical disk 10, to the spindle motor 11 via the servo unit 60 and the drive unit 70, and causes the directory management information recorded on the optical disk 10 to be read by controlling the optical pickup 20, at step S20. The  
15 waveform of a high-frequency reproduction signal, which is read and reproduced from the rotated optical disk 10, is filtered and shaped by the R/F unit 50, and the signal is restored to original digital data by the digital reproduction signal processing unit 30b, decoded by the  
20 MPEG decoder 90, and then input to the microcomputer 80. In this case, the microcomputer 80 stores the input directory management information in the memory 81 at step S21.

Thereafter, the microcomputer 80 provides the  
25 directory information to the user based on the stored directory management information. In this case, the microcomputer 80, as shown in FIG. 4, causes the 'indications of presence (o)' to be marked so that directories in which MP3 files exist are distinguished from  
30 other directories, and constructs directory information so that the number of recorded files is marked to indicate that files other than MP3 files have been recorded in other directories for which the 'indications of presence (o)' are

not marked, at step S22. In this case, the directory information is constructed so as to be displayed in the horizontal direction of the screen or in the reverse direction thereof. The directory information constructed  
5 as described above is converted into OSD text by the OSD 92, is synthesized into a background screen output from the NTSC encoder 91, and is then output to the screen of a TeleVision (TV), which is an external display device, at step S23, so that the user can identify directories in  
10 which MP3 files have been recorded from the directory information of FIG. 4, which is displayed on the screen, at a glance without selecting respective directories and checking the details thereof and, at the same time, can determine whether different types of files have been  
15 recorded in directories in which no MP3 file has been recorded.

Meanwhile, when the user selects a specific directory, including desired detailed information, from the directory information of FIG. 4 using a remote controller while  
20 moving a designation pointer to 'a', 'b' and 'c', the microcomputer 80 outputs and displays detailed information, such as the type of files (file names), which exists in the selected specific directory, through an external display device based on the management information stored in the  
25 memory 81 and, thereby, provides the detailed information to the user. For this purpose, when generating the directory information, the microcomputer 80 memorizes the coordinate values icons corresponding to respective directories, thus allowing the user to easily be aware of  
30 the directory selected at the time of input of an 'enter' key.

Furthermore, the microcomputer 80 may provide the directory information in a different form using the

directory management information stored in the memory 81, for example, may provide information about directories in which MP3 files exist among the plurality of directories of the optical disk 10 along with information about the upper 5 directories with respect to those directories, and information about the names of MP3 files in the directories, like FIG. 5, thus allowing the user to easily view in detail only directories in which MP3 files exist.

Furthermore, the microcomputer 80 may provide 10 directory information in the form of FIG. 6 using the directory management information stored in the memory 81. In this case, the microcomputer 80 classifies all of files recorded on the optical disk 10 according to type, and provides the respective classified files along with 15 information about the directories in which the files are recorded, thus allowing the user to identify the type of files that are recorded on the optical disk 10 and the directories in which files exist at a glance.

Meanwhile, although, in the embodiment, whether or 20 not an MP3 file is recorded in each of the directories on the optical disk 10 is marked as shown in FIG. 4 at the request of the user, information about only a specific directory selected by the user may be provided. In the case where an MP3 file is recorded in directory A when the 25 user selects the directory A, an 'indication of presence (O)' is marked for that directory A and, thereby, the fact that an MP3 file is recorded therein is indicated. In the case where no MP3 file is recorded in the directory A, the number of files recorded in the directory is marked, so 30 that it can be seen that no MP3 file is recorded in the directory A but that other types of files are recorded therein.

Furthermore, in the embodiment, the directory



management information may be provided without recording and storing it in the optical disk 10. In this case, whenever there is a request from a user, the microcomputer 80 searches all directories or selected directories, which exist on the optical disk 10, determines whether MP3 files exist in found directories one by one, constructs directory information as described above, and then provides the directory information through an external display device.

#### 10 Effect Of The Invention

The method of displaying directory information according to the present invention, constructed as described above, arranges information about directories that exist on the optical disk and provides the directory information to a user, so that the user can identify directories in which MP3 files are recorded at a glance, therefore the inconvenience in which all directories must be searched one by one to find a specific MP3 file can be avoided. Furthermore, the method provides, along with recorded MP3 files, information about the uppermost directories in which the respective files are recorded, so that the user can easily find a desired MP3 file, therefore playback of the MP3 file can be achieved in a shorter time period.

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#### **What is claimed is:**

1. A method of displaying directory information, comprising:

a first step of checking information about directories for data files, which are recorded on a recording medium, and attributes of the respective data files;

a second step of generating Identification (ID) marks for visually identifying files, having a specific attribute, based on information about the checked attributes of the data files; and

5 a third step of displaying the generated ID marks, in conjunction with the information about directories for the checked files, on a screen.

2. The method of Claim 1, wherein the files, each  
10 having a specific attribute, are MP3 format files.

3. The method of Claim 1, wherein the third step displays the respective files, each having a specific attribute, in conjunction with the ID marks, on the screen.  
15

4. The method of Claim 3, wherein the display of the screen at the third step comprises information about uppermost directories in which the files, having a specific attribute, are contained.

20 5. The method of Claim 4, wherein each of the ID marks displayed, in conjunction with names of the directories, on the screen comprises information about whether a number of files included in each of upper  
25 directories is plural.

6. The method of Claim 1, wherein the third step displays the directories in a horizontal direction of the screen or in a reverse direction thereof.  
30

7. The method of Claim 1, wherein the third step displays names of upper directories, including only the files each having a specific attribute, in conjunction with

the respective ID marks.

8. A method of displaying directory information, comprising:

5       a first step of checking information about directories for data files, which are recorded on a recording medium, and attributes of the respective data files;

10       a second step of generating ID marks for visually identifying files, having a specific attribute, based on information about the checked attributes of the data files; and

15       a third step of displaying information about the selected file and an upper directory including the selected file on a screen.

9. The method of Claim 8, wherein the file having the specific attribute is an MP3 format file.

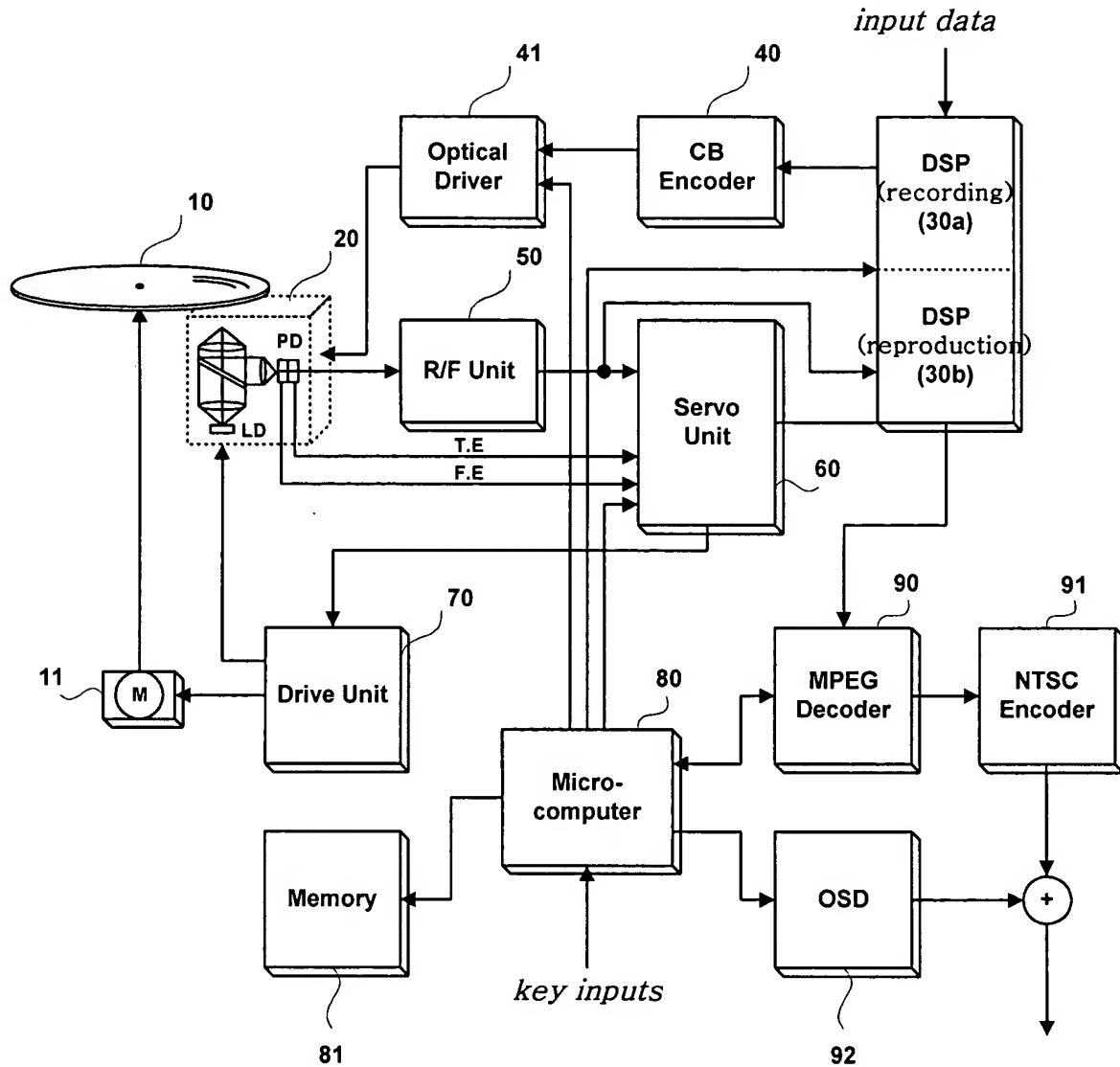
20       10. The method of Claim 8, wherein the third step displays information about an uppermost directory, including the file, on the screen at a location adjacent, with respect to name, to the file having a specific attribute.

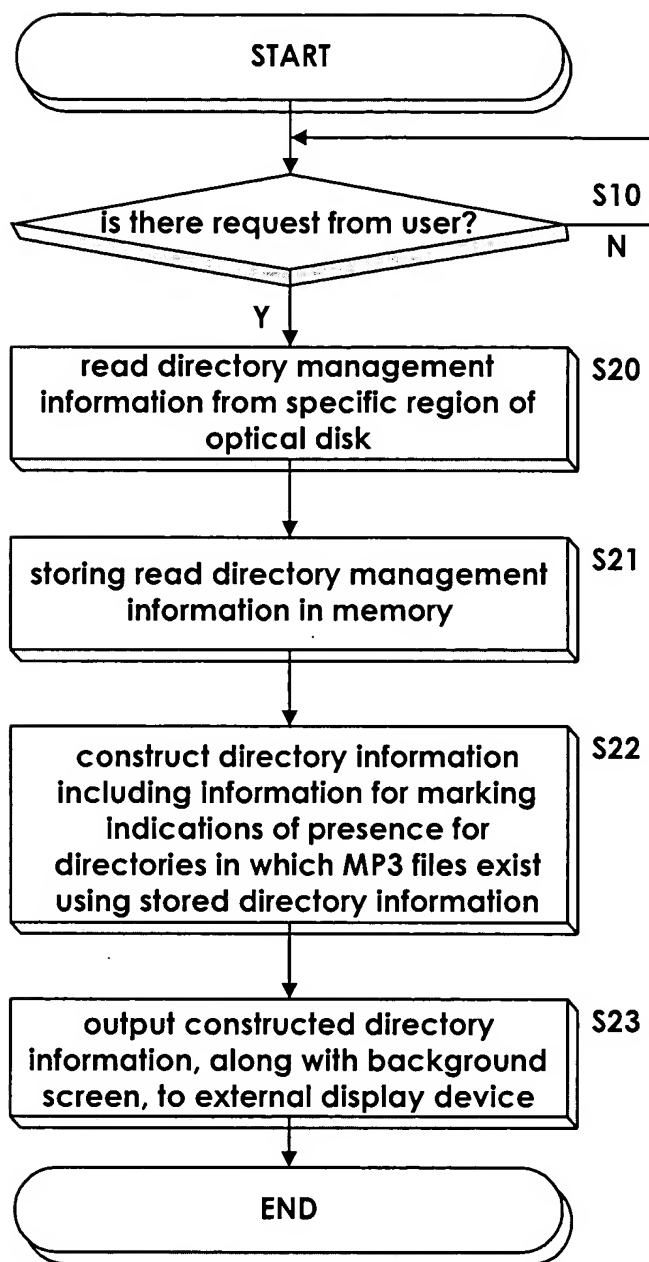
25       11. The method of Claim 8, wherein the information about the directory displayed on the screen is displayed such that at least a portion thereof is arranged in a horizontal direction or in a reverse direction thereof.

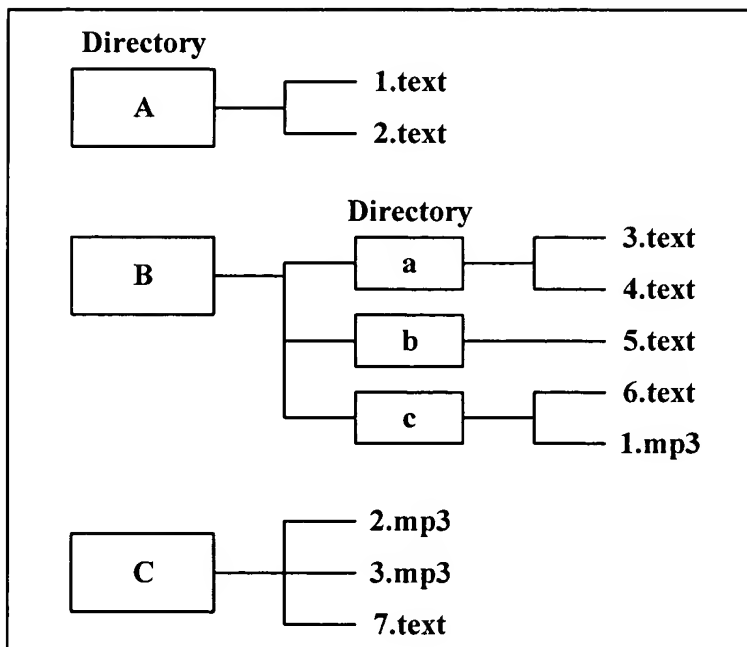
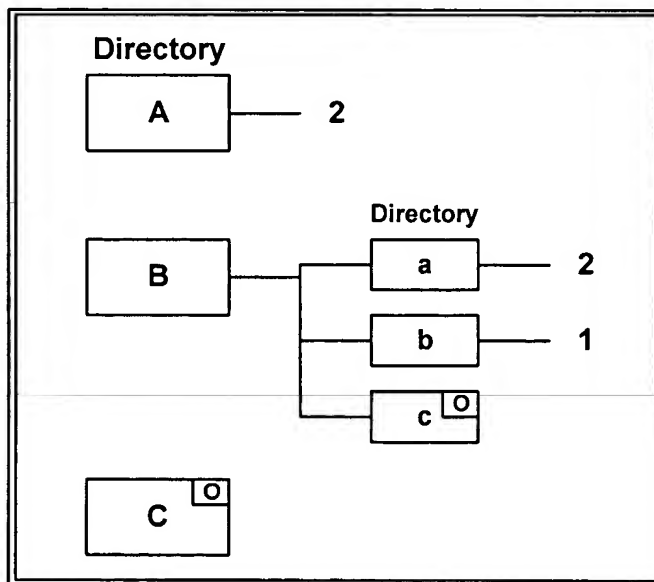
30       12. The method of Claim 8, wherein the third step displays information about files, each of which does not have a specific attribute, and directories including the

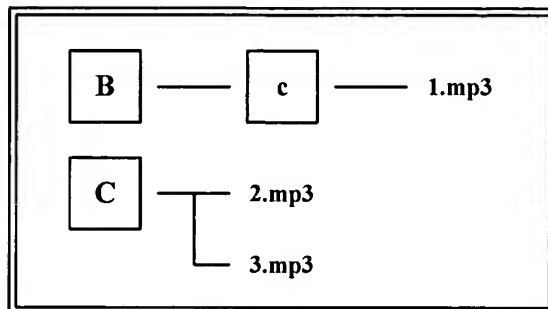
files, while dividing regions in a vertical direction of the screen.

FIG. 1



**FIG. 2**

**FIG. 3****FIG. 4**

**FIG. 5****FIG. 6**